Digitized by the Internet Archive
in 2026

https://archive.org/details/developmental-biology_1995_172_contents

Volume 172, 1995

DEVELOPMENTAL BIOLOGY

Editor-in-Chief
Eric N. Olson

Consulting Editor
Helen M. Blau

Editors
Marianne Bronner-Fraser
Eric H. Davidson
Scott Fraser
Richard Harland
Philip Ingham
Laurinda A. Jaffe
Robb Krumlauf
Andrew P. McMahon
Gary Ruvkun
Matthew P. Scott

ACADEMIC PRESS
San Diego New York Boston London Sydney Tokyo Toronto

Copyright © 1995 by Academic Press, Inc.

DEVELOPMENTAL BIOLOGY is a registered trademark
of Academic Press, Inc. (Harcourt Brace & Company)

All Rights Reserved

No part of this publication may be reproduced or transmitted in any form, or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the copyright owner.

The appearance of the code at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use, or for the personal or internal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per copy fee through the Copyright Clearance Center, Inc. (222 Rosewood Drive, Danvers, Massachusetts 01923), for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. Copy fees for pre-1995 articles are as shown on the article title pages; if no fee code appears on the title page, the copy fee is the same as for current articles.

0012-1606/95 $12.00

MADE IN THE UNITED STATES OF AMERICA

This journal is printed on acid-free paper.

DEVELOPMENTAL BIOLOGY

Contents of Volume 172

Number 1, November 1995

Announcement

John Philip Trinkaus: First Recipient of the Edwin Grant Conklin Medal in Developmental Biology — **William R. Jeffery** — **viii**

Mini-Review

Regulation of Muscle Differentiation by the MEF2 Family of MADS Box Transcription Factors — **Eric N. Olson, Michael Perry, and Robert A. Schulz** — **2**

Full Papers

Regional Specification during Embryogenesis in the Inarticulate Brachiopod *Glottidia* — **Gary Freeman** — **15**

Myogenin's Functions Do Not Overlap with Those of MyoD or Myf-5 during Mouse Embryogenesis — **Alan Rawls, Julia Hsi Morris, Michael Rudnicki, Thomas Braun, Hans-Henning Arnold, William H. Klein, and Eric N. Olson** — **37**

Characterization of Myosin-IA and Myosin-IB, Two Unconventional Myosins Associated with the *Drosophila* Brush Border Cytoskeleton — **Nancy Strom Morgan, Matthew B. Heintzelman, and Mark S. Mooseker** — **51**

Differential Regulation of Oocyte Maturation and Cumulus Expansion in the Mouse Oocyte–Cumulus Cell Complex by Site-Selective Analogs of Cyclic Adenosine Monophosphate — **Stephen M. Downs and Mary Hunzicker-Dunn** — **72**

Expression of *snail2*, a Second Member of the Zebrafish Snail Family, in Cephalic Mesendoderm and Presumptive Neural Crest of Wild-Type and *spadetail* Mutant Embryos — **Christine Thisse, Bernard Thisse, and John. H. Postlethwait** — **86**

The *in Vivo* Expression of the FGF Receptor FREK mRNA in Avian Myoblasts Suggests a Role in Muscle Growth and Differentiation — **Christophe Marcelle, John Wolf, and Marianne Bronner-Fraser** — **100**

β-Catenin Has Wnt-like Activity and Mimics the Nieuwkoop Signaling Center in *Xenopus* Dorsal–Ventral Patterning — **Kathleen A. Guger and Barry M. Gumbiner** — **115**

Hedgehog and *Bmp* Genes Are Coexpressed at Many Diverse Sites of Cell–Cell Interaction in the Mouse Embryo — **Mark J. Bitgood and Andrew P. McMahon** — **126**

Effect on Sperm-Induced Activation Current and Increase of Cytosolic Ca^{2+} by Agents That Modify the Mobilization of $[Ca^{2+}]_i$. I. Heparin and Pentosan Polysulfate — **Tatsuma Mohri, Pedro I. Ivonnet, and Edward L. Chambers** — **139**

10 469HI XL 1251 9/96 31249-150

Synapse-Associated Expression of an Acetylcholine Receptor-Inducing Protein, ARIA/Heregulin, and Its Putative Receptors, ErbB2 and ErbB3, in Developing Mammalian Muscle	**Lisa M. Moscoso, Gerald C. Chu, Medha Gautam, Peter G. Noakes, John P. Merlie, and Joshua R. Sanes**	**158**
Nerve Cell Differentiation in Nerve-Free Tissue of Epithelial Hydra from Precursor Cells Introduced by Grafting. I. Tentacles and Hypostome	**Sumiko Minobe, Osamu Koizumi, and Tsutomu Sugiyama**	**170**
Involvement of Cyanide-Resistant Respiration in Cell-Type Proportioning during *Dictyostelium* Development	**Shin-Ichi Matsuyama and Yasuo Maeda**	**182**
Activin and Its Receptors during Gastrulation and the Later Phases of Mesoderm Development in the Chick Embryo	**Claudio D. Stern, Ruth T. Yu, Akira Kakizuka, Chris R. Kintner, Lawrence S. Mathews, Wylie W. Vale, Ronald M. Evans, and Kazuhiko Umesono**	**192**
Is There a *Brachyury the Second*? Analysis of a Transgenic Mutation Involved in Notochord Maintenance in Mice	**Gabriela M. Rennebeck, Eric Lader, Qi Chen, Rudy A. Bohm, Zeling S. Cai, Cynthia Faust, Terry Magnuson, Larry R. Pease, and Karen Artzt**	**206**
Neoplastic Transformation and Aberrant Cell–Cell Interactions in Genetic Mosaics of *lethal(2)giant larvae (lgl)*, a Tumor Suppressor Gene of *Drosophila*	**Namita Agrawal, Madhuri Kango, Arati Mishra, and Pradip Sinha**	**218**
Two *cis* Elements Collaborate to Spatially Repress Transcription from a Sea Urchin Promoter	**Tony N. Frudakis and Fred Wilt**	**230**
BMP-4 Regulates the Dorsal–Ventral Differences in FGF/MAPKK-Mediated Mesoderm Induction in *Xenopus*	**Jennifer Northrop, Amy Woods, Rony Seger, Atsushi Suzuki, Naoto Ueno, Edwin Krebs, and David Kimelman**	**242**
Developmental Analysis of the $Hba^{th\text{-}1}$ Mouse Mutation: Effects on Mouse Peri-Implantation Development and Identification of Two Candidate Genes	**Jaqueline Hendrey, David Lin, and Marie Dziadek**	**253**
Developmental Regulation of Genomic Imprinting during Gametogenesis	**Angela J. Villar, E. M. Eddy, and Roger A. Pedersen**	**264**
Regulated Processing of *dec-1* Eggshell Proteins in *Drosophila*	**M. Isabel Noguerón and Gail L. Waring**	**272**
Dermo-1: A Novel Twist-Related bHLH Protein Expressed in the Developing Dermis	**Li Li, Peter Cserjesi, and Eric N. Olson**	**280**
Progression and Recapitulation of the Chondrocyte Differentiation Program: Cartilage Matrix Protein Is a Marker for Cartilage Maturation	**Qian Chen, David M. Johnson, Dominik R. Haudenschild, and Paul F. Goetinck**	**293**
Apoptosis in the Neuronal Lineage of the Mouse Olfactory Epithelium: Regulation *in Vivo* and *in Vitro*	**J. David Holcomb, Jeffrey S. Mumm, and Anne L. Calof**	**307**

Genetic Analysis of Developmental Mechanisms in Hydra. XXII. Two Types of Female Germ Stem Cells Are Present in a Male Strain of *Hydra magnipapillata*	**Chiemi Nishimiya-Fujisawa and Tsutomu Sugiyama**	324
Rapid Communication		
Specification of the Anteroposterior Neural Axis through Synergistic Interaction of the Wnt Signaling Cascade with *noggin* and *follistatin*	**L. Lynn McGrew, Cheng-Jung Lai, and Randall T. Moon**	337
Feature		**f-1**

Number 2, December 1995

Introduction		
The Developmental Consequences of RNA Processing	**Mary Bownes**	343
Reviews		
Translational Control in Spermatogenesis	**Mireille Schäfer, Karim Nayernia, Wolfgang Engel, and Ulrich Schäfer**	344
The Developmental Consequences of Alternate Splicing in Sex Determination and Differentiation in *Drosophila*	**Colin MacDougall, Diane Harbison, and Mary Bownes**	353
mRNA Localisation during Development	**David R. Micklem**	377
Developmental Role of Transcription Factor Isoforms Generated by Alternative Splicing	**A. Javier López**	396
Mini-Review		
Heterochrony and the Phylotypic Period	**Michael K. Richardson**	412
Full Papers		
Cytoskeletal Control of Myogenesis: A Desmin Null Mutation Blocks the Myogenic Pathway during Embryonic Stem Cell Differentiation	**Georg Weitzer, Derek J. Milner, Jai Up Kim, Allan Bradley, and Yassemi Capetanaki**	422
The Epidermis Is a Source of Directional Information for the Migrating Pronephric Duct in *Ambystoma mexicanum* Embryos	**Julie Drawbridge, Amy E. Wolfe, Yara Lìa Delgado, and Malcolm S. Steinberg**	440
Sequence and Expression of Grasshopper Antennapedia: Comparison to *Drosophila*	**David C. Hayward, Nipam H. Patel, E. Jay Rehm, Corey S. Goodman, and Eldon E. Ball**	452
Fetal Brain Subdivisions Defined by R- and E-Cadherin Expressions: Evidence for the Role of Cadherin Activity in Region-Specific, Cell–Cell Adhesion	**Hiroaki Matsunami and Masatoshi Takeichi**	466

Hairless Promotes Stable Commitment to the Sensory Organ Precursor Cell Fate by Negatively Regulating the Activity of the *Notch* Signaling Pathway	**Anne G. Bang, Adina M. Bailey, and James W. Posakony**	479
The Ames Dwarf Gene Is Required for Pit-1 Gene Activation	**Bogi Andersen, Richard V. Pearse II, Keith Jenne, Mark Sornson, Sheng-Cai Lin, Andrzej Bartke, and Michael G. Rosenfeld**	495
Neuronal Production of Fibronectin in the Cerebral Cortex during Migration and Layer Formation Is Unique to Specific Cortical Domains	**Allan M. Sheppard, Janice E. Brunstrom, Tracey N. Thornton, Raymond W. Gerfen, Thomas J. Broekelmann, John A. McDonald, and Alan L. Pearlman**	504
Different Roles for Fibronectin in the Generation of Fore and Hind Limb Precartilage Condensations	**Sherry A. Downie and Stuart A. Newman**	519
Expressed Ryanodine Receptor Can Substitute for the Inositol 1,4,5-Trisphosphate Receptor in *Xenopus laevis* Oocytes during Progesterone-Induced Maturation	**Evgeny Kobrinsky, Karol Ondrias, and Andrew R. Marks**	531
An ECM-Bound, PDGF-like Growth Factor and a TGF-α-like Growth Factor Are Required for Gastrulation and Spiculogenesis in the *Lytechinus* Embryo	**Venkatesh Govindarajan, Ravi K. Ramachandran, Jenny M. George, Diane C. Shakes, and Craig R. Tomlinson**	541
Four-Dimensional Microscopic Analysis of the Filopodial Behavior of Primary Mesenchyme Cells during Gastrulation in the Sea Urchin Embryo	**Katherine M. Malinda, Gregory W. Fisher, and Charles A. Ettensohn**	552
Identification of Inducing, Responding, and Suppressing Regions in an Experimental Model of Notochord Formation in Avian Embryos	**Shipeng Yuan, Diana K. Darnell, and Gary C. Schoenwolf**	567
Changes in Responsiveness to Extracellular ATP in Chick Skeletal Muscle during Development and upon Denervation	**David G. Wells, Mark J. Zawisa, and Richard I. Hume**	585
Dorsal and Ventral Cell Types Can Arise from Common Neural Tube Progenitors	**Kristin B. Artinger, Scott Fraser, and Marianne Bronner-Fraser**	591
*trk*C-Mediated NT-3 Signaling Is Required for the Early Development of a Subpopulation of Neurogenic Neural Crest Cells	**Paul D. Henion, Andrew S. Garner, Thomas H. Large, and James A. Weston**	602
Analysis of Neural-Responsive Myogenin Upstream Sequences by Myoblast Implantation	**Gretchen Gibney and Andres Buonanno**	614
Halves of Epithelial Somites and Segmental Plate Show Distinct Muscle Differentiation Behavior *in Vitro* Compared to Entire Somites and Segmental Plate	**Anton J. Gamel, Beate Brand-Saberi, and Bodo Christ**	625

A Developmental Role for the Heterotrimeric G Protein Go_α in a Migratory Population of Embryonic Neurons	**A. M. Horgan, M. T. Lagrange, and P. F. Copenhaver**	**640**
Propagated and Nonpropagated Calcium Transients during Egg Activation in the Annelid, *Chaetopterus*	**William R. Eckberg and Andrew L. Miller**	**654**
Initial Cell-Type Choice in a Simple Eukaryote: Cell-Autonomous or Morphogen-Gradient Dependent?	**Jennifer L. Clay, Robin R. Ammann, and Richard H. Gomer**	**665**
Imaging Protein Kinase C Activation in Living Sea Urchin Eggs after Fertilization	**James L. Olds, Antonella Favit, Thomas Nelson, Giorgio Ascoli, Adam Gerstein, Mark Cameron, Lisa Cameron, David S. Lester, Terese Rakow, Jean De Barry, Tohru Yoshioka, Zachary Freyberg, Joshua Baru, and Daniel L. Alkon**	**675**
Polarized Expression of the Receptor Protein Tyrosine Kinase Cek5 in the Developing Avian Visual System	**Jocelyn A. Holash and Elena B. Pasquale**	**683**
Rapid Communications		
TTF-1 Regulates Lung Epithelial Morphogenesis	**Parviz Minoo, Hasnah Hamdan, Ding Bu, David Warburton, Philip Stepanik, and Robert deLemos**	**694**
A Novel TGF-β-like Gene, *fugacin,* Specifically Expressed in the Spemann Organizer of *Xenopus*	**V. Ecochard, C. Cayrol, F. Foulquier, A. Zaraisky, and A. M. Duprat**	**699**
Protein Tyrosine Kinase Activity during Egg Activation Is Important for Morphogenesis at Gastrulation in the Sea Urchin Embryo	**William H. Kinsey**	**704**
The Receptor Tyrosine Kinase QEK5 mRNA Is Expressed in a Gradient within the Neural Retina and the Tectum	**Daryn Kenny, Marianne Bronner-Fraser, and Christophe Marcelle**	**708**
Acknowledgment		**717**
Author Index for Volume 172		**719**
Cumulative Author Index for Volumes 170–172		**721**
Cumulative Subject Index for Volumes 170–172		**725**
Feature		**f-1**

DEVELOPMENTAL BIOLOGY

Information for Authors

Developmental Biology publishes papers containing new and significant information bearing on developmental mechanisms of general interest. Areas of particular interest include experimental manipulation of embryos or tissues, genetic and transgenic approaches to studying gene expression, transcriptional control mechanisms, embryonic patterning, cell–cell interactions, fertilization, growth factors and signal transduction, regulatory hierarchies, and evolutionary mechanisms. Descriptive work, at either the anatomical or molecular level, will not be published unless it leads to new insights into developmental processes.

Articles usually do not exceed 15,000 words and must be preceded by an abstract of about 200 words.

Rapid Communications present findings that will have an immediate and significant impact and should therefore be made known to other researchers as quickly as possible. These reports will be reviewed within one week of receipt and, if accepted, will be published in the next available issue. Rapid Communications are limited to two printed pages consisting of 1200 words, two tables or figures, and eight references. An abstract not exceeding 150 words should be included. Rapid Communications may be submitted by fax if they do not include photographs. To expedite publication of such articles, authors will not receive proofs.

Review articles usually are solicited; however, the Editor-in-Chief invites inquiries and suggestions. Review articles are subject to the same review process as regular articles, but receive priority publication.

Submission of manuscripts. Manuscripts must be written in English. **Submit 1 original and 3 copies**, including illustrations, to *Developmental Biology*, Editorial Office, 525 B Street, Suite 1900, San Diego, CA 92101-4495. Authors may suggest an appropriate Editor to handle their paper.

Original papers only will be considered. Submission of a manuscript implies the authors' assurance that the work has not been published nor is under consideration for publication elsewhere and that its submission for publication has been approved by all of the authors and by the institution where the work was carried out.

Authors submitting a manuscript do so on the understanding that if the manuscript is accepted for publication, copyright in the article, including the right to reproduce the article in all forms and media, shall be assigned exclusively to the Publisher. The Publisher will not refuse any reasonable requests by authors for permission to reproduce any of their contributions to the journal.

Preparation of manuscript. Manuscripts should be double-spaced throughout on one side of $8\frac{1}{2} \times 11$-inch or A4 paper. Pages should be numbered consecutively and organized as follows: title page (page 1), which should contain the article title, authors' names and complete affiliations, footnotes to the title, a running title of fewer than 50 characters, and the address for correspondence (including telephone and fax numbers and an e-mail address); abstract (page 2); introduction; materials and methods; results; discussion (results and discussion may be combined); acknowledgments; references; footnotes; tables; and figure legends. Most recommendations of the Council of Biology Editors should be followed; consult the *CBE Manual for Authors, Editors, and Publishers,* 6th ed. (Cambridge University Press). Nonstandard abbreviations should be defined at their initial appearance.

References should be cited in the text by name and date. Only articles that have been published or are in press should be included in the references. Unpublished results or personal communications should be cited as such in the text. Please use the following styles in the reference section:

Arcaro, K. F., and Lnenicka, G. A. (1995). Intrinsic differences in axonal growth from crayfish fast and slow motoneurons. *Dev. Biol.* **168,** 272–283.

Girard, S., and Clapham, D. E. (1994). Simultaneous near ultraviolet and visible excitation confocal microscopy of calcium transients in *Xenopus* oocytes. *In* "Methods in Cell Biology" (R. Nuccitelli, Ed.), Vol. 40, pp. 263–283. Academic Press, San Diego.

Figures should be in a finished form suitable for publication. Number figures consecutively with Arabic numerals and indicate the top and the authors on the back of each figure. Lettering on drawings should be professional quality or generated by high-resolution computer graphics and must be large enough to withstand appropriate reduction for publication.

Two color figures will be published *free* of charge in each article. **Additional color figures** will be published *free* of charge at the discretion of the Editors. Color figures *must* be submitted on flexible board due to the nature of the reproduction process.

Suggestions for **cover photographs** are welcome. Submit them as slides with $8\frac{1}{2} \times 11$-inch color or black-and-white prints to accompany specific articles. A short (one-line) legend should accompany each photograph.

Tables should be numbered consecutively with Arabic numerals in order of appearance in the text. Type each table double-spaced on a separate page with a short descriptive title typed directly above and with essential footnotes below. Authors should submit complex tables as camera-ready copy.

Proofs and reprints. Proofs will be sent to the authors with reprint order forms. Fifty reprints of each article are provided free of charge. Additional reprints may be ordered using the form provided.

Personal computer disks. Each manuscript should be submitted to *Developmental Biology* on a personal computer disk after the paper has been accepted and after all revisions have been incorporated into the text. Label the disk with the type of computer used, the type of software and the version number, and the disk format. A hard-copy printout of the manuscript that exactly matches the disk file must be supplied.

Distribution of material. Authors who publish a research article in *Developmental Biology* must be prepared to freely distribute to academic researchers for their own use any cell lines, DNA clones, monoclonal antibodies, or genetically engineered mice described in the article. All genetic sequence information published in *Developmental Biology* must also be deposited with GenBank.

For information about advertising in *Developmental Biology*, please contact Andrea Priske, Advertising Coordinator, Academic Press, Inc., 525 B Street, Suite 1900, San Diego, California 92101-4495 (telephone: (619) 699-6825, fax: (619) 699-6380).